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SUBJECT: QUENCHING THE THIRST: WATER FOR TURKEY'S HOUSEHOLDS

[¶11.](#) Summary. Turkey has invested \$30 billion over the past five decades in a massive water management system that challenges the limitations of its semi-arid climate. As a result, Turkey provides household water supply systems to 70 percent of its population, including 62 percent in rural areas. The thirsty system requires an annual \$2 billion investment and faces financial and institutional challenges as well as threats to supply and quality. End Summary.

Long-term strategy: 100 percent capture

[¶12.](#) In recent decades, Turkey has built 211 large and 765 small dams that irrigate 4.5 million ha of land, generate 42,229 GWh/year of energy and provide 2 billion m³ of potable water to 20 million people in 14 cities. Only India and China have built more dams. To finance its water infrastructure, Turkey has received IBRD/IDA support, including \$942.7 million for water supply and sewage projects, \$797.9 million for electric power and \$118 million for agriculture projects. This effort has enabled Turkey to capture 42 billion meters cubed (m³) of its 110 billion m³ of exploitable water. By comparison, exploitable water in Greece is about half (62 billion m³) and a hundred times less in Israel (1.65 billion m³). However, Turkey's water per capita has fallen from 1,950 m³ to 1,580 m³ from 1990 to 2000 due to increases in population, urbanization and industrialization as well as a decrease in renewable resources.

[¶13.](#) To provide adequate supply for its 67 million people, the General Directorate of State Hydraulic Works (DSİ) within the Ministry of Energy and Natural Resources (MOENR) developed a 30-year plan to capture all exploitable water by [¶2030](#). This plan requires \$ 2 billion annually for new construction and operations. As with previous years, the allocation for 2002 fell short, this time at \$1.2 billion.

[¶14.](#) Seventy five (75) percent of water captured goes to agriculture. About 15 percent goes for industrial use and the remaining 10 percent for household purposes. The remainder of this cable addresses domestic water supply. Septels will address water for hydropower and agriculture.

Domestic supply: Slightly behind world average

[¶15.](#) NATIONAL AND RURAL SUPPLY. Water supply systems serve about 70 percent of the population, including 62 percent of those living in Turkey's 34,720 rural villages. These figures fall below WHO estimates that 82 percent of the world's overall population and 71 percent of the world's rural population are served by water supply systems. Turkey's numbers show a stronger water infrastructure for overall and rural populations than do WHO measurements for overall and rural populations in Africa (62 and 47 percent, respectively), but a less complete infrastructure than Europe (96 and 87 percent) and Asia (81 and 75 percent).

[¶16.](#) MUNICIPAL SUPPLY. Turkey's municipal water systems reach 95 percent of the total municipal population. This number compares favorably to WHO estimates of municipal systems that reach 93, 85, and 83 percent in municipal populations in Latin America, Africa, and Asia, respectively.

[¶17.](#) SUPPLY IN THE SOUTHEAST. The Southeastern Anatolia Project (GAP) plans to complete its regional municipal water network by 2010. As of 1999, 42 percent of the region's municipalities had water networks, 28 percent had networks under construction and 30 percent had no connection to water supply systems. In provinces further east -- Agri, Hakkari and Siirt -- the fewest number of villages have water supply

systems.

18. DSI subsidizes municipalities by providing water infrastructure. Municipalities set their own water pricing policies, with schemes varying from city to city. Among samples studied, Istanbul's household water per m³ appears to be most costly (\$.73 - 2.56) and Kaseri's in Central Anatolia among the least (\$.30 - .54). These figures do not include 18 percent VAT.

A View from the cities

19. Ankara: Without additional facilities, Ankara is projected to face a water shortage in 2007. The city uses only two thirds of its stored water due to insufficient pipelines capacity. The much-needed Isikli project, which would provide sufficient water through 2027, is currently unfunded. The U.S. Trade and Development Agency (TDA) funded a feasibility study on water loss management, but the project went unfunded. TDA also provided funding for water system feasibility studies in the three cities below.

10. Istanbul: A rapid population increase and an aging water system that leaks 50 percent of its contents has challenged Istanbul's municipal water resources. To meet its water needs through 2040, Istanbul will undertake two major water projects funded by the Japanese International Cooperation Agency, including the dramatic Melen project that will construct large pipelines under the Bosphorus and build the largest water treatment plant in Europe.

11. Antalya: During tourist season, the population of this Mediterranean resort surges 73 percent. In 2004, Antalya will begin the second phase of a \$535 million-project that should meet the city's potable water supply and wastewater requirements until 2020.

12. Izmir: The recently constructed \$120 million Tahtali Dam will provide Izmir with sufficient water storage, treatment and transportation for decades.

Institutional challenges

13. The General Directorate of State Hydraulic Works (DSI) was established in 1953 within MOENR as the primary executive state agency responsible for national water resource planning, management and execution. Although employing the best of Turkey's hydrologists, it is criticized for failing to bring in "young blood" and for being tight-fisted with information.

14. Discussions with water professionals have identified three challenges facing Turkey's water institutions: lack of institutional coordination, lack of data sharing, and under-trained professionals.

-- In theory, only four government agencies have decision-making authority in national water policy. Unofficial counts tally up to seven ministries and 18 general directorates, plus 81 provincial governates with water responsibilities and dozens of Water Users Associations that manage 80 percent of irrigation water. One hydrology professor called this cacophony "an appalling abdication of responsibility" of the state. However, an Ministry of Environment official projected that about 80 percent of these overlaps would be resolved in legislation submitted to parliament on 1/8/03.

-- Data sharing is nearly non-existent. Many government agencies, consultants and researchers monitor water quality. Each measures different parameters for different reasons. Several unsuccessful attempts have been made to create a national data bank. According to a former DSI Director General, Turkey is "not even close" to establishing a national water database because the under-funded agencies compete rather than cooperate.

-- Professional skills need strengthening. With insufficient expertise available, many technical projects completed in the 1970s (groundwater modeling programs, river basin reports), have sat idle or without updates. Newly developed models become academic exercises with no follow-

up. Often, outside consultants do work that should be done in-house. Alternately, work simply does not get done.

Some threats to water quality and supply

¶15. The greatest threat to Turkey's fresh water is inadequate waste management infrastructure. Only 13 percent of municipal waste is disposed of in sanitary landfills (Ref A). The rest is dumped without treatment in rivers and open pits. Across Turkey, gas stations flush their tanks directly into groundwater sources. Many wastewater treatment plants are poorly run. A former DSI scientist told us of one plant where water was more contaminated after treatment than before.

¶16. Deforestation and erosion affect water resources. Without healthy root systems to cling to soil, rainwater and snowmelts run uncontrolled and cannot be captured. More than 75 percent of Turkey's land is prone to erosion and forested areas have diminished 0.22 percent in the past decade (20,000 ha per year).

¶17. An insufficient understanding of water-use principles at the user level threatens water supply, particularly in agricultural areas of the southeast. Farmers with newly installed irrigation systems frequently over-irrigate, leading to salt-intrusion (salination) and water-rise problems across broad geographic areas.

Groundwater contamination threatens health

¶18. Insufficient enforcement of environmental laws and water regulations, a lack of public awareness, a lack of political will and a technical inability to match contaminants with sources compound groundwater problems. Industrial waste, agricultural run-off and other elements are allowed to degrade groundwater quality. In addition to negatively affecting public health, this reduces crop yields, freshwater biodiversity and quantities of freshwater fish catches, and increases eutrophication and costs to reduce pollution levels.

¶19. Turkey's National Environmental Action Plan lists one of the three most important domestic water resources (the Sakarya Basin in central Anatolia) among the most polluted. The most polluted basins and lakes are concentrated in the industrialized western region, with only Lake Van in eastern Anatolia considered "at risk," this due to sewage discharge, industrial wastewater, and agricultural run-off.

¶20. Scientific studies brim with examples of groundwater contamination that outpaces enforcement of the "polluter pays" principle in environmental law. Many industries are identified as heavy polluters -- textile industry, sugar beet plants, paper factories, alkaloid companies. Many communities fight contamination -- Hatay (organic, inorganic pollutants), Mersin (heavy industrial pollutants), Adana (agricultural run-off), and Kemalpasa (cyanide).

¶21. The former Director General acknowledges that water quality is not well monitored due to economic constraints. These constraints also affect DSI's laboratory capacity, forcing Turkey to send samples to Canada to assure reliable assessments.

Comment

¶22. Turkey has made the best of a dry situation, but it needs to clarify its water management further, strengthen the professional capacity of its technicians, enhance its public education efforts, and establish a national database. Meeting the needs of a growing population will require substantial investment in infrastructure and continual institutional vigilance.